PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH COLUMBIA

Omineca River Moose Forage Enhancement 1992 - 1994

P. E. Hengeveld
February 1998

PWFWCP Report No. 132

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

Citation: P. E. Hengeveld. February 1998. Omineca River moose forage enhancement 1992 - 1994. Peace/Williston Fish and Wildlife Compensation Program, Report No. 132. 8pp plus appendices.

Author(s): Pamela E. Hengeveld[1]

Address(es): [1] Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave., 3rd Floor Prince George, B.C. V2L 3H9

105-02867/

INTRODUCTION

Construction of the Peace River's W.A.C. Bennett dam in 1968 resulted in the flooding of approximately 1700km^2, creating the Williston Reservoir. The Peace/Williston Fish and Wildlife Compensation Program (PWFWCP) is funded by B.C. Hydro, and co-operates with B.C. Environment, to offset the loss of fish and wildlife habitat incurred by the dam's construction. The PWFWCP's mandate is to protect and enhance fish and wildlife populations and their habitat in the Williston watershed through long-term management and enhancement plans.

More than half of the area flooded by the reservoir was rated as Class 1 winter range for ungulates, the highest quality range available (Davidson and Dawson 1990). These lands included some of the best moose winter range in B.C.; the carrying capacity of moose may have been reduced by as many as 12,500 animals as a result of the flooding (Finlay Omineca Strategic Plan 1989). Moose is still the major game species in this area, and careful management is necessary to maintain or augment current population levels.

In winter, moose use areas where mature forest is interspersed with herbaceous openings and wetlands, and their distribution is strongly influenced by the availability of winter forage and degree of snow depth. Moose inhabit most of the remaining lowland areas in the Williston Basin and often concentrate in the valleys and lower sidehills of its major rivers. The Omineca River valley is important moose range and receives particularly high use during the winter, as snow depths here are lower than in surrounding areas.

The development of mature deciduous vegetation communities on undisturbed ranges (i.e., areas where wildfires are not common or have been prevented) reduces the amount of available browse for moose, thus reducing the carrying capacity of the habitat. Browse is defined as the leaves, shoots, and twigs of shrubs and trees used as food (Yoakum *et al.* 1980). Shrubs such as willow *(Salix spp.)* and red-osier dogwood *(Cormis stolonifera)* are preferred moose forage and these grow well in open areas. However, moose cannot reach the browse present on tall, large-diameter willow (e.g., >4m high and >15cm dbh), and dense thickets of smaller-diameter vegetation may be impenetrable. Mature willow and willow thickets are characteristic of various sites along the Omineca River. Such areas can be improved for moose by setting back the successional stage of the vegetation, thereby increasing both the abundance and quality of forage available. Two main techniques for enhancing forage are prescribed burning and manual cutting methods (Yoakum *et al.* 1980). These techniques have been adopted by the PWFWCP to meet its wildlife habitat enhancement goals.

Lowland riparian or wetland areas like the Omineca River valley are generally not conducive to burning; prescribed burns are conducted primarily on drier, south-facing, mature deciduous sidehills. Manual cutting is more site-specific and species-specific than burning and does not directly affect understory browse species or soil conditions. This technique can be particularly

useful for enhancing moose forage in areas where large-diameter willows and willow thickets are prevalent.

Cutting inaccessible large-diameter willow stems provides an immediate food source for ungulates once stems are on the ground. Felling these mature willows also increases the amount of light reaching the ground, promoting understory shrub and herbaceous growt beneficial to ungulates, bears and beavers. Impenetrable thickets of small-diameter willow can be thinned, and thereby improved for wildlife, by cutting 'lanes' into the dense growth (Yoakum *et al.* 1980). This facilitates both site access and forage development. Suckering, whereby new shoots of growth sprout from the base of dead shrub trees such as aspen, willow, and birch, provides new browse for ungulates. In addition, cut piles left on the ground provide nesting and protective cover for small animals and birds, and may harbour young plant growth. Thus, manual cutting not only benefits the target species, it can also benefit a variety of other fauna and flora.

This report documents moose forage enhancement activities conducted by PWFWCP along the Omineca River in 1992 and 1994. Though enhancement activities were also planned for 1993, funding restrictions postponed this effort.

STUDY AREA and PRELIMINARY SITE ASSESSMENTS

The Omineca River flows easterly, entering the Williston Reservoir opposite the Peace Arm (Figure 1). The lower valley bottom is situated in the dry cool Boreal White and Black Spruce (BWBSdk) biogeoclimatic zone, which features long, very cold winters and short growing seasons (DeLong *et al.* 1991). It has the least snowfall of all northern biogeoclimatic zones; snow depths for the Omineca River valley average 60-80cm in March (Corbould and Martin, in prep; Davidson and Dawson 1990). Major tree species in the river valley include white spruce *(Picea glauca),* hybrid white spruce *(Picea engelmannii x glauca),* black spruce *(Picea mariana),* lodgepole pine *(Pinus contorta),* and trembling aspen *(Populus tremuloides).* White spruce, black cottonwood *(Populus balsamifera ssp. trichocarpa),* and willow are predominant along the river's broad floodplain.

Surveys were conducted by PWFWCP biologists in 1991 to assess moose habitat along the Omineca River and identify potential enhancement sites. The portion of the riparian area identified as suitable for enhancement is between Discovery Creek and the unnamed creek approximately 5km downstream of Jackfish Creek (bounded by longitudes 124°35' and 125°06', and ranging 800-1000m above sea level). The river's course in this area is gently meandering with many oxbows.

Most sites identified during the survey showed evidence of high use by moose, including heavily browsed vegetation, worn game trails, and numerous winter moose-pellet groups. Beaver activity was also prevalent. Some sites were described as willow 'forests', where

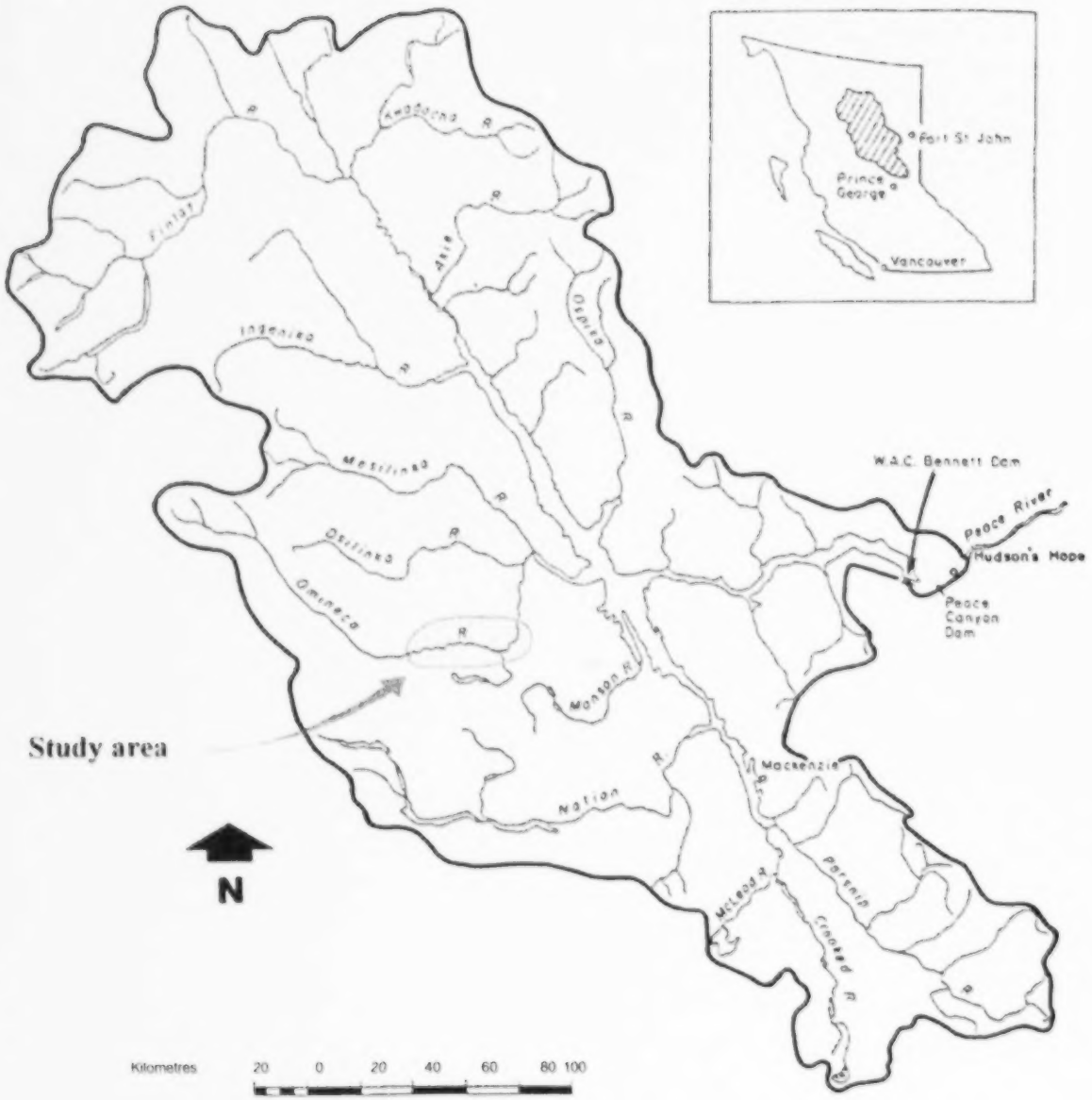

Figure 1. Omineca River within the Williston Reservoir watershed.

willow trunks 17-30cm in diameter and greater than 6m in height dominated smaller browse species such as red-osier dogwood, saskatoon *(Amelanchier alnifolia)*, black twinberry *(Lonicera involucrata)*, highbush-cranberry *(Viburnum edule)* and rose *(Rosa spp.)*. In some cases, willow canopy coverage was estimated at 90%, with as little as 20% available as forage due to its height above ground. Sites selected for forage enhancement in 1992 and 1994 were based on data gathered during these surveys.

FORAGE ENHANCEMENT WORK: 1992

The PWFWCP tendered a contract in July 1992 for the manual enhancement of moose forage at three sites along the Omineca River. Janet Besherse of Germansen Landing was awarded a contract for $7,488 to cut, by chainsaw, a total of 15ha of over-mature willow according to specific guidelines. Site locations are identified as 1, 13 South, and 18 (Figure 2); site boundaries are illustrated on forest cover maps in Appendix A. Parallel strips were cut at each site, with alternating 'cut' strips and 'leave' strips (Table 1).

Table 1. Site specifications for manual forage enhancement, 1992.

Site	Site Area (ha)	Proposed Cut Size (ha)	Cut Strip Bearing (°)	Cut Strip Width (m)	Leave Strip Width (m)
1	22	5	5	5	17
13S-1	16	4	340	5	15
13S-2	0.6	0.2	270	5	10
13S-3	0.9	0.3	360	5	10
18	17	5.5	340	5	10
TOTAL	56.5	15			

The specifications for cutting along the 5m strips involved removing all willows smaller than 15cm in diameter in 'thicket' areas, and removing one of every two willows greater than 15cm dbh in willow 'forest' areas. At all sites, cottonwoods, aspen, conifers, and snags were left intact (e.g., not cut), game trails were kept clear of brush, and a 3m wide non-cut buffer strip was maintained where sites bordered the Omineca River or its backchannels.

This work was completed as specified in September and October of 1992, with the exception of sections 2 and 3 of site 13 S. These areas were inundated by the Omineca River, preventing the contractors from accessing and felling the willow. The total area cut was therefore 14.5ha, reducing the contract total by $249.60. Final cost of the moose forage enhancement was $499/ha.

Figure 2. Manual forage enhancement sites, 1992 and 1994 (map 93N 1:250,000).

FORAGE ENHANCEMENT WORK: 1994

The second PWFWCP contract to conduct manual forage enhancement along the Omineca River was tendered in June 1994. The successful bidder (Long Shot Enterprises of Germansen Landing at $15,180) was instructed to cut a total of 13ha of willow at three sites along the Omineca River. The sites, identified as 12 East, 13 North and 14 North (Figure 2) were accessed by boat from the Forest Service campground just west of "12 Mile". Site boundaries are illustrated on forest cover maps in Appendix A

As in 1992, parallel strips were cut at each site, with alternating 'cut' and 'leave' strips interspaced (Table 2). However, in 1994, the cut strips were made three times wider than in 1992. Strips cut in 1992 proved to be too narrow to permit sufficient light penetration through the remaining willow canopy and were very quickly over-grown by willow from adjacent leave strips.

Table 2. Site specifications for manual forage enhancement, 1994.

Site	Site Area (ha)	Proposed Cut Size (ha)	Cut Strip Bearing (°)	Cut Strip Width (m)	Leave Strip Width (m)
12E	4	2	180	15	15
13N	9.5	4.75	360	15	15
14N	12.5	6.25	200	15	15
TOTAL	26	13			

In 1994, all willows in the 'cut' strip were felled, regardless of size. Willows of large diameter were bucked so that they would lie flat on the ground. At all three sites the 15m swath was completely felled and, at site 13N, the bucked stems were piled after felling. Trees that appeared to be used by wildlife (e.g., cavity nesters or nesting birds) were left standing, as were all cottonwoods, conifers, and snags. Game trails were kept clear of debris and a 3m wide non-cut buffer strip was maintained along the edge of watercourses.

This work was completed as specified in August and September of 1994. The total area cut was 13ha, at a cost of $1,168/ha. The sites were inspected by helicopter in October 1994 and aerial video footage of the enhanced areas was obtained.

POTENTIAL FOR FUTURE FORAGE ENHANCEMENT

In the summer of 1998, PWFWCP biologists will assess the effectiveness of manual cutting as a means of enhancing moose forage at the Omineca River sites. The potential of conducting future manual forage enhancement projects will be addressed at that time. A PWFWCP report evaluating the cost-effectiveness of various forage enhancement techniques suggests that prescribed burning is more cost-effective than manual methods of forage enhancement (Zemlak *et al,* in prep.). However, manual cutting (if determined to be effective) may still be considered in areas which are not suitable for prescribed burning.

During the 1991 habitat assessments along the Omineca River, some locations were identified as trial sites for prescribed burning. These were areas of non-productive brush characterized by over-mature willow forests or dense willow growth, low water tables, low risk of fire escape (e.g., having oxbows, islands), and having an Environmentally Sensitive Area (E.S.A) classification of 'Ew' (denoting critical importance to wildlife). A proposal to burn 3 such sites (4, 11, and 12W — 48ha total; Appendix B) was presented by BC Environment Habitat Protection staff, on behalf of the PWFWCP, at the Omineca Land and Resource Unit Planning meeting in September 1992. Though prescribed burns in upland forests are typically conducted in spring when high ground moisture minimizes danger of fire escape, burning conditions for wetland or riparian areas are optimal in the fall, when these areas are at their driest. The proposal was approved but the burns were not carried out due to weather and Ministry of Forests staffing limitations.

A second proposal to burn 3 sites (4, 12W, and 18 — 38ha total; Appendix B) was submitted to, and approved by, the Ministry of Forests in September of 1994, but the burns were postponed due to unfavourable site and weather conditions. The sites have been incorporated into PWFWCP's 1996 Prescribed Burn Plan for the Mackenzie Forest District (Agra Earth and Environmental Ltd, in prep.).

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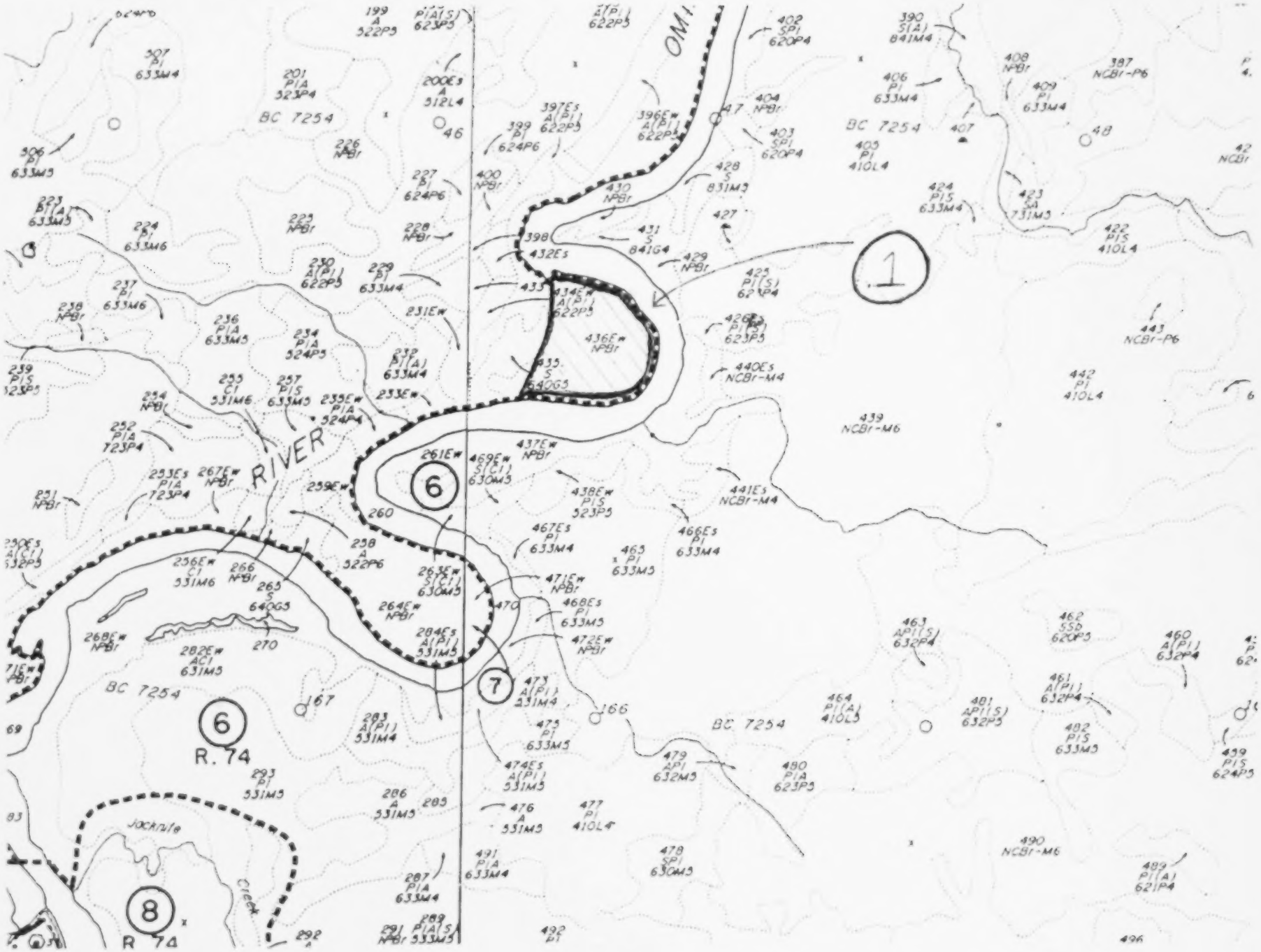
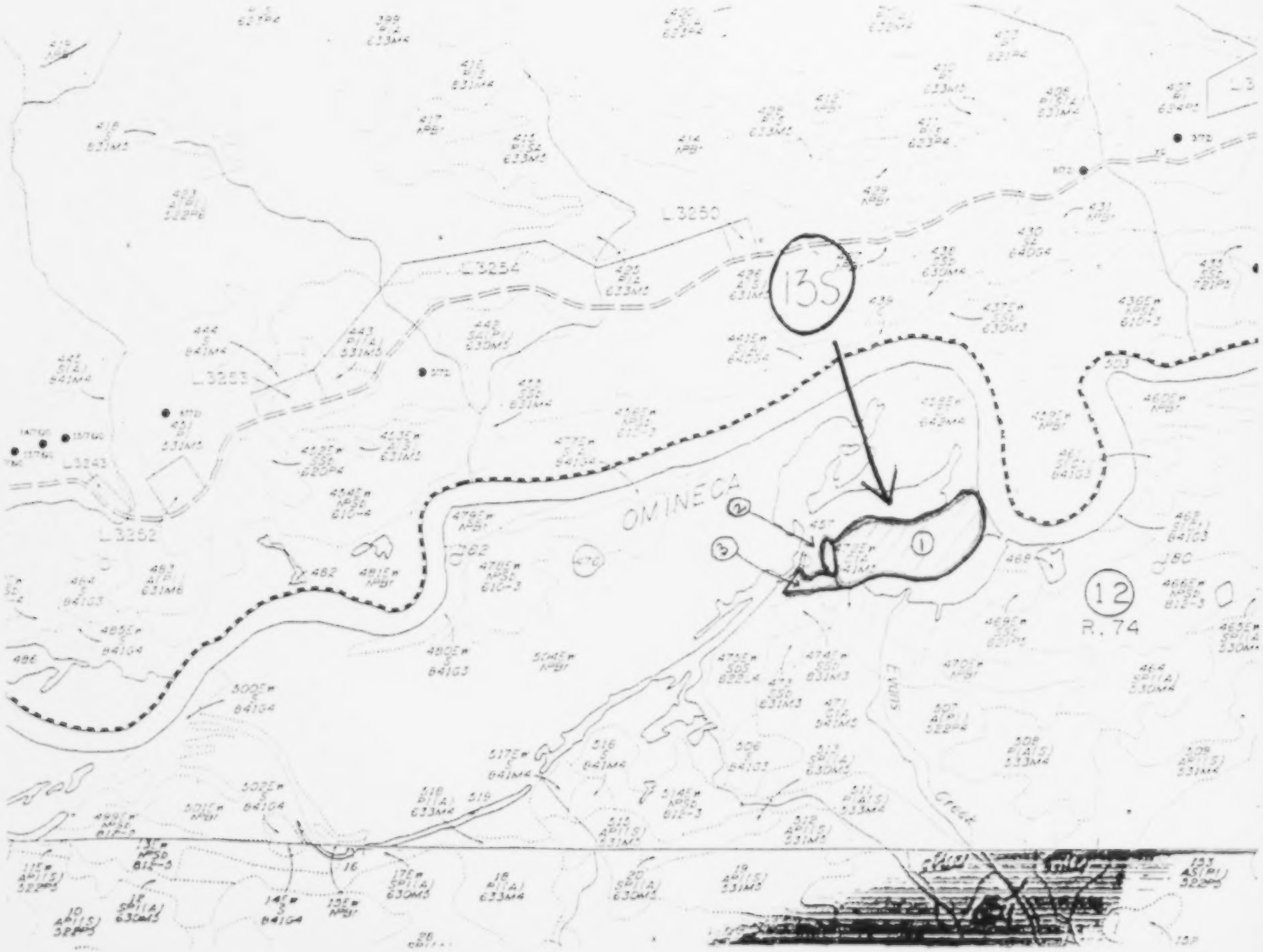
APPENDIX A:

Manual forage enhancement site locations plotted on forest cover maps.


RIVER
OMI
BC 7254
R. 74
Creek
1
6
7
8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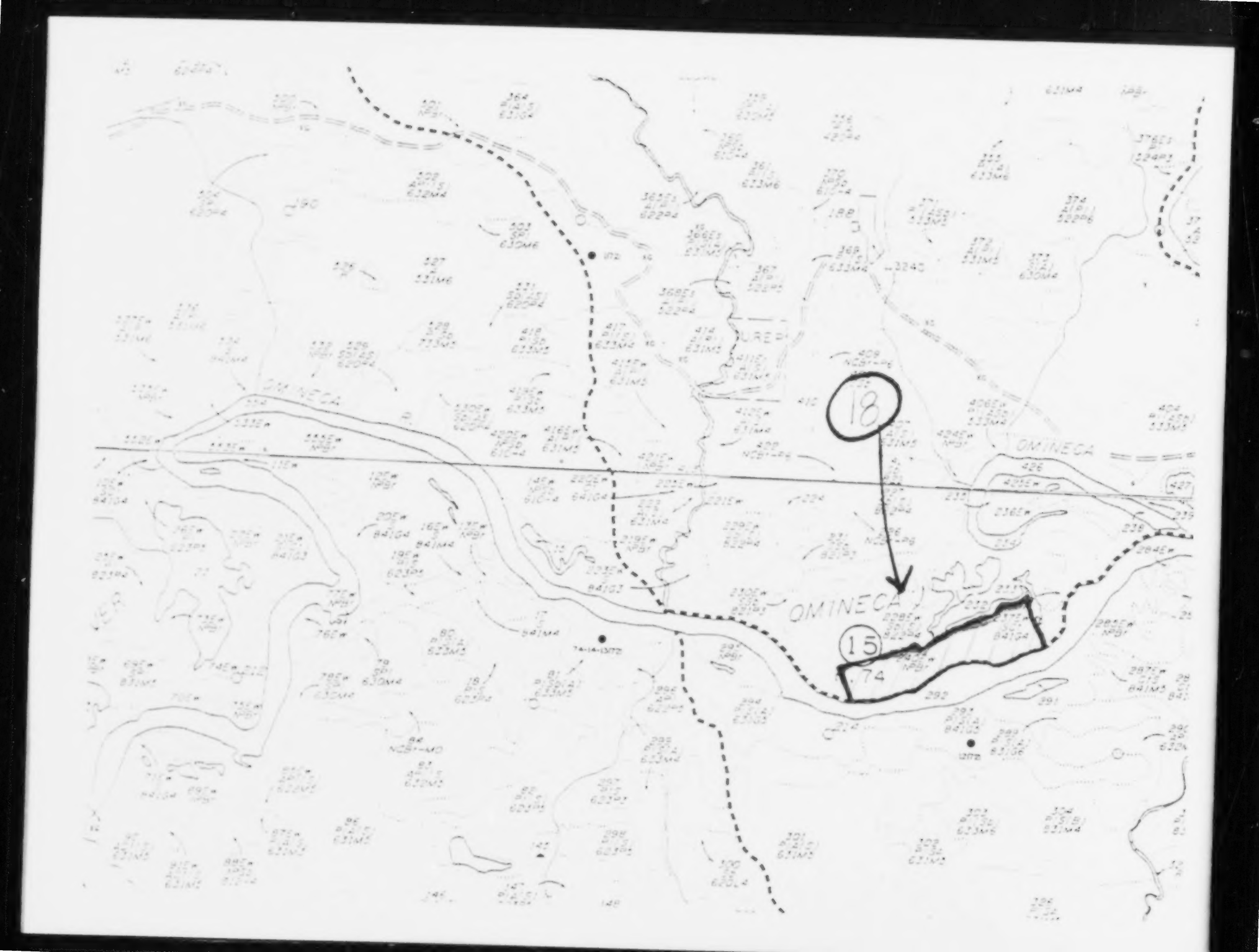
12
R. 74
OMINECA
L3250
L3254
L3253
L3252
L3243
1
2
3


18
15
.74
OMINECA
OMINECA

L.3244
L.3250
L.3254
OMINECA
SITE 13N
SITE 12E
12
R. 74
RIV

SITE 14
OMINECA
L3254
L3253
L3252
L3243
L3250
BC 7254

APPENDIX B:

Potential prescribed burn sites.

CT DT
CS DS
RANGES
NELL
RANGE
WOLVERINE
FINLAY
RANGE
12W
11
4
18
12 Mile
RIVER
Germansen Landing
OMINECA
OMINECA
Pluglat Mountain
Tinnesha Hill
Manson Creek
GERMANSEN RANGE
Mount (Germansen)
Bickle Mountain
Baldy Mountain
Mount Gibs